FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING

WATER RESOURCES ENGINEERING PROGRAMME

FINAL YEAR PROJECT PROPOSAL

PROJECT TITLE

DESIGN AND CONSTRUCTION OF A SOLAR POWERED AQUAPONIC WATER FOUNTAIN

(Busitema University Main Campus)

BY

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A final year project proposal submitted to the Department of Water Resources Engineering as a partial fulfilment for the award of Bachelor of Science in Water Resources Engineering.

ABSTRACT

The water fountain at Busitema university is a Solar powered Aquaponic water fountains. This fountain consists of filtration systems, drainage and overflow systems, fish and plants (aquaponics), solar power system and Automation system.

Samples of the fishpond effluent were collected for its quality characterization. The parameters tested included Total ammonia, Dissolved oxygen, pH, temperature. The results showed that ammonia levels were high above the acceptable range. The DO level in the effluent was below the minimum acceptable of 5mg/L. However, when the fishpond effluent was passed through a vegetable-based bio-filter, the concentration of ammonia in the fishpond effluent was reduced to the acceptable range (below 1mg/L), safe for reuse in the fishpond. The water was pumped back to the fish tank through the fountain sprinkler and nozzles. This system recirculates used water hence reduce water wastage and consumption compared to traditional farming. The only losses in the system are due to evaporation and transpiration.

The system is controlled using a mobile App. Arduino Uno is programmed using Arduino software to control the electronic components like pumps including pH sensor, temperature sensor, and water level sensor. The sensors were used to measure the water quality parameters; that is, pH, temperature and water level in the tank respectively. The micro controller reads data from the sensors, and sends and commands to actuators to execute an operation. All information is visualized from the app which also enables the user to turn off the main pump, and sturdy variations of temperature and pH in a day.

DECLARATION

We, hereby declare to the best of our knowledge, that this project report is an outcome of our original work and that it has not been presented to any institution of learning for an academic award**.**

Name: ……... Signature: ……

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APPROVAL

This final research report has been submitted to the Faculty of Engineering for examination with approval of our supervisor.

MAIN SUPERVISOR: MR. MASERUKA S BENDICTO

Signature……

Date……/……/…….

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Lastly, we are grateful to Faculty for enabling us access the water pool (facility) source with a lot of ease, to the quality control officers of Busitema University and the entire staff for the permission granted to carry on the research work, to our fellow students and friends in and out of the university for their unseasonal support and to our parents and guardians. May God bless all your endeavors.

ACRONYMS

FAO—Food and Agriculture organization

NUE—Nutrient use efficiency

RAS—Recirculating aquaculture system

N--Nitrogen

P--Phosphorus

K--Potassium

Mg-- Magnesium

Fe--Iron

NH3-- Ammonia

NH4+--Ammonium

NO2- --Nitrite

NO3- --Nitrate

TAN—Total ammonia nitrogen

HRT—Hydraulic Residence time

HLR—Hydraulic loading rate

Q—flow rate

t—time

T--Temperature

pH—potential of hydrogen

DO—Dissolved oxygen

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